

## P/ NT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year)  
16 March 2000 (16.03.00)

International application No.  
PCT/GB99/02160

Applicant's or agent's file reference  
104970/01

International filing date (day/month/year)  
06 July 1999 (06.07.99)

Priority date (day/month/year)  
15 July 1998 (15.07.98)

Applicant

GALLAGHER, John, Gerrard

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

14 February 2000 (14.02.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

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Authorized officer

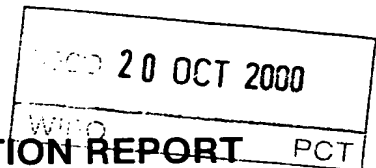
Juan Cruz

Telephone No.: (41-22) 338.83.38

# PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



Applicant's or agent's file reference 104970/01	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/02160	International filing date (day/month/year) 06/07/1999	Priority date (day/month/year) 15/07/1998
International Patent Classification (IPC) or national classification and IPC G01N11/16		
Applicant HYDRAMOTION LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 5 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  14/02/2000	Date of completion of this report  19.10.2000
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Papantoniou, E  Telephone No. +49 89 2399 2468



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/02160

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

### Description, pages:

1-7 as originally filed

### Claims, No.:

1-10 as originally filed

### Drawings, sheets:

1/5-5/5 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/02160

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims 4, 8 - 10
	No:	Claims 1 - 3, 5 - 7
Inventive step (IS)	Yes:	Claims
	No:	Claims 1 - 10
Industrial applicability (IA)	Yes:	Claims 1 - 10
	No:	Claims

### 2. Citations and explanations

see separate sheet

## VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

## VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: EP-A-0 282 251

D2: WO-A-91 17423

2. Claim 1

D1, which is considered as the closest prior art, discloses a sensor comprising a mechanical resonator (10, Fig. 1, D1) including an element (12, 14, Fig. 1, D1) of which the stiffness (e.g. the reactance caused by the pressure of the fluid surrounding the tines 12, 14) at least partially determines a modal shape (e.g. the frequency) of the resonance of the resonator (see column 3, lines 43 - 50, D1) and means (20, column 3, lines 20 - 27, D1) for measuring a variation of a measure of the resonance as the stiffness of said element changes (due to the fluid pressure).

Thus the subject matter of present claim 1 is not new (Article 33(2) PCT).

3. Claim 6

D2 discloses a method of sensing comprising measuring variation of frequency (see page 9, lines 5 - 11, D2) of a part of a resonator (15, Fig. 1, D2) as a result of a change in modal shape of the resonator caused by a change in stiffness (due to changes in the metallic surface layer of the crystal 15, Fig. 1, D2).

Thus the subject matter of claim 6 is not new (Article 33(2) PCT).

4. Dependent claims 2 - 5 and 7 - 10 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step, the reasons being as follows:

The features of claims 2, 3, 5, 8 - 10 are known from D1, the features of claims 4,

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/GB99/02160

7 are known from D2.

5. It is noted that the independent claims are so broadly formulated that they do not seem to be new in view of also the other search documents.

**Re Item VII**

**Certain defects in the international application**

For the sake of completeness, it is mentioned that the requirements of Rule 5.1 (a)(ii) PCT (identification of D1 and D2) and Rule 6.3(b) PCT (correct two part form of claims 1 and 6) are not met.

**Re Item VIII**

**Certain observations on the international application**

Method claims 7 - 10 are not dependant to the independent method claim 6 (but rather to apparatus claim 5). Such dependance is not clear (Article 6 PCT).

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>104970/01</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/GB 99/ 02160</b>	International filing date (day/month/year) <b>06/07/1999</b>	(Earliest) Priority Date (day/month/year) <b>15/07/1998</b>
Applicant  <b>HYDRAMOTION LIMITED et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

## 1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 9

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

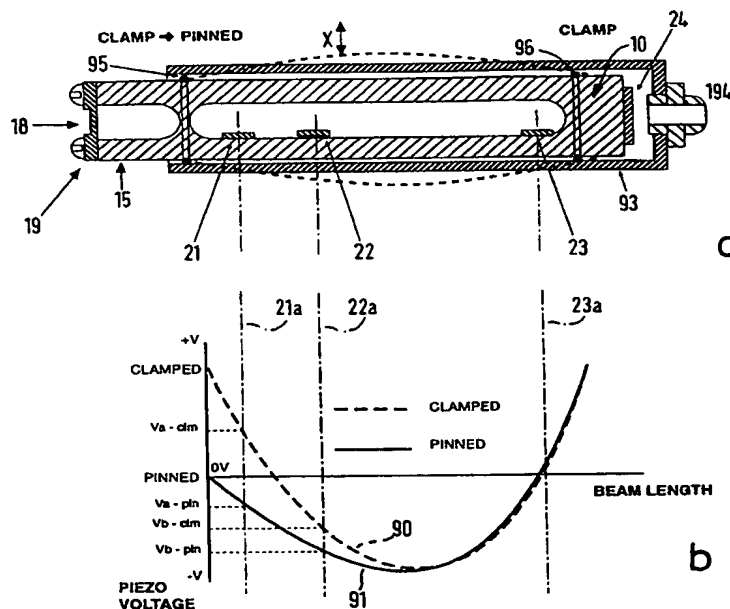
☐ None of the figures.



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>G01N 11/66, 9/00, G01L 9/00, G01N 29/02</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/04370</b> <b>(43) International Publication Date:</b> 27 January 2000 (27.01.00)
<b>(21) International Application Number:</b> PCT/GB99/02160 <b>(22) International Filing Date:</b> 6 July 1999 (06.07.99)  <b>(30) Priority Data:</b> 9815232.5      15 July 1998 (15.07.98)      GB  <b>(71) Applicant (for all designated States except US):</b> HYDRAMOTION LIMITED [GB/GB]; 1 York Road Industrial Park, Malton, North Yorkshire YO17 0NW (GB).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> GALLAGHER, John, Gerard [GB/GB]; 77 Town Street, Old Malton, Malton, North Yorkshire YO17 0HD (GB).  <b>(74) Agent:</b> HORTON, Andrew, Robert, Grant; Bowles Horton, Felden House, Dower Mews, High Street, Berkhamsted, Hertfordshire HP4 2BL (GB).		<b>(81) Designated States:</b> AU, CA, CN, GB, JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>

(54) Title: DIAGNOSTIC SENSOR



## (57) Abstract

A sensor of force or viscosity or other attributes of a fluid comprises a mechanical resonator (10) including an element (11; 18; 123) of which the stiffness at least partially determines a modal shape of the resonance of the resonator and means (21-23) for measuring a variation of a measure of the resonance as the stiffness of said element changes. The resonator (10) may comprise two beams (10a, 10b; 120, 121) connected at or near one end by a yoke (12; 122) which provides a clamped condition of the resonator at said one end and connected at or near another end by said element.



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EE	Estonia	LR	Liberia	SG	Singapore		

# INTERNATIONAL SEARCH REPORT

National Application No  
PC 1, GB 99/02160

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N11/16 G01N9/00 G01L9/00 G01N29/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N G01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 087 612 A (FOXBORO CO) 7 September 1983 (1983-09-07) abstract	1-5
Y	EP 0 282 251 A (SCHLUMBERGER ELECTRONICS UK) 14 September 1988 (1988-09-14) abstract	1-5
X	US 4 095 474 A (HANCOCK PETER ET AL) 20 June 1978 (1978-06-20) column 2, line 10-15; claims 5,6	6,7
X	WO 91 17423 A (PURA FIL INC) 14 November 1991 (1991-11-14) page 1-3; claim 1	6,7
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

12 October 1999

Date of mailing of the international search report

27/10/1999

Name and mailing address of the ISA

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Authorized officer

Brison, O

## INTERNATIONAL SEARCH REPORT

International Application No  
PC 1 / GB 99/02160

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 201 215 A (GRANSTAFF VICTORIA E ET AL) 13 April 1993 (1993-04-13) abstract; claim 1 ---	6-9
X	US 4 299 122 A (UEDA TOSHITSUGU ET AL) 10 November 1981 (1981-11-10) abstract: figure 4 ---	6, 10
X	EP 0 129 753 A (QUARTZTRONICS INC) 2 January 1985 (1985-01-02) abstract; claim 30 ---	6
A	R. M. LANGDON: "Resonator sensors - a review" JOURNAL OF PHYSICS E. SCIENTIFIC INSTRUMENTS., vol. 18, 1985, pages 103-115, XP002118564 IOP PUBLISHING, BRISTOL., GB the whole document -----	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/02160

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0087612	A	07-09-1983	AU 1122583 A JP 58156826 A	01-09-1983 17-09-1983
EP 0282251	A	14-09-1988	AT 85848 T DE 3878473 A GB 2202944 A,B JP 2730903 B JP 63308528 A US 4922745 A	15-03-1993 25-03-1993 05-10-1988 25-03-1998 15-12-1988 08-05-1990
US 4095474	A	20-06-1978	NONE	
WO 9117423	A	14-11-1991	AT 100586 T AU 8071191 A CA 2081339 A,C DE 69101062 D DE 69101062 T EP 0527949 A JP 6058319 B US 5208162 A	15-02-1994 27-11-1991 09-11-1991 03-03-1994 26-05-1994 24-02-1993 03-08-1994 04-05-1993
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US 4299122	A	10-11-1981	JP 1221194 C JP 55051329 A JP 58056425 B	26-07-1984 15-04-1980 14-12-1983
EP 0129753	A	02-01-1985	US 4574639 A AT 37233 T CA 1232775 A DE 3474064 A JP 60010148 A US 4526480 A US 4644803 A US 4644796 A	11-03-1986 15-09-1988 16-02-1988 20-10-1988 19-01-1985 02-07-1985 24-02-1987 24-02-1987